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DEFENSE INTELLIGENCE AGENCY
WASHINGTON, D. C. 20301

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19 APR 1965

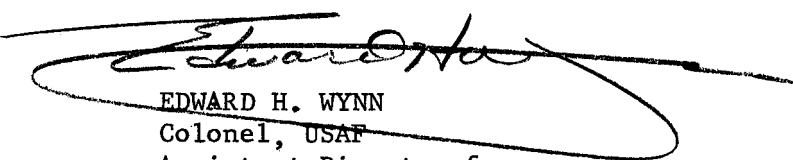
S-226/ST-3

SUBJECT: Soviet Multiple Re-entry Vehicles (U)

TO: Distribution List

1. (C) The enclosed report on Soviet Multiple Re-entry Vehicles, prepared in response to questions asked informally of DIA by various DoD agencies, is forwarded for your information. The material includes information furnished by USAF Foreign Technology Division (FTD), General Electric Co. (TEMPO), and Office of the Director for Defense Research and Engineering (ODDR&E), and reflects recent changes in estimates of Soviet ICBM REV weights. The tables shown were prepared with the assistance of Mr. Sargent of DDR&E (DS) and are based on calculations made for similar papers on multiples, distributed by the Assistant Secretary of Defense for Defense Research and Engineering.
2. (C) Although the payload quantities and mixes are feasible, they do not represent a postulation of Soviet intent. However, a study entitled "Soviet Ballistic Missile Re-entry Vehicles" is being prepared by the Director of Missile Intelligence, U.S. Army, and is scheduled for publication in fiscal year '66. The document will include a treatment of Soviet multiples based on analysis of scientific and technical intelligence. A copy of this study will be made available to consumers as will the analysis of intelligence that comes to light in the interim.
3. (U) Inquiries regarding the enclosure should be directed to DIA and marked for the attention of DIAST.

FOR THE DIRECTOR:


EDWARD H. WYNN
Colonel, USAF
Assistant Director for
Scientific and Technical Intelligence

1 Enclosure a/s

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**OSD AND DIA REVIEW
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DISTRIBUTION LIST

The Assistant Secretary of Defense (DDR&E), ATTN: Mr Sargent

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SOVIET MULTIPLE RE-ENTRY VEHICLES (U)

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SOVIET MULTIPLE RE-ENTRY VEHICLES (U)

1. (S) At present, DIA has no conclusive evidence to indicate that the Soviets are developing a multiple re-entry vehicle system. Should they do so, however, we believe they will first develop a multiple package wherein all warheads would be delivered on a single area, line or point target. The payload mix may include decoys, jammers and/or chaff. This "shotgun" approach is within the state of their art as demonstrated by injection of multiple objects into orbit. We believe that the next step, then, would involve Multiple Individual Re-entry Vehicles (MIRV) wherein individual REV's or groups of them would be launched at different targets. These, too, may include a penails mix.

a. (S) Because of the complexities associated with a MIRV system, DIA doubts that a significant threat will be posed before 1970. A test program lasting 18 to 24 months would not be unreasonable; deployment could be expected at the conclusion of the test period. We doubt that the Soviets could develop fully such a system in secrecy. Early launches for ICBM applicability probably would be detected and identified at once.

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No conclusive evidence of either has been obtained by DIA.

b. (S) Among the problems associated with MIRVs, guidance is of major concern. At present the Soviets can expect [redacted] CEP for later generation single warhead ICBMs; developments between now and 1970 may reduce this to about [redacted]. We do not believe that they will attempt to achieve an accuracy much greater than this because greater warhead efficiencies can be expected by that time. Moreover, to obtain accuracies [redacted] the Soviets would have to minimize the REV contribution to overall error by precisely controlling the initial re-entry conditions, including vehicle orientation. Evidence to date shows that they have not emphasized REV attitude control. Consequently, we doubt that any one warhead of a MIRV package will have a CEP of [redacted]. This figure represents a trade-off [redacted].

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The suggested CEP [redacted] also takes into account improved guidance which could be expected between now and 1970. We believe also that MIRV CEPs of [redacted] will not be demonstrated before 1975.

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2. (S) DIA has no intelligence evidence upon which to assess the composition of a MIRV payload. However, if such a system were developed, the payloads probably would not differ much in make-up from those developed for use in a "shotgun" approach, although the warheads might be considerably larger, [REDACTED] Moreover, any multiple capability, whether MIRV or "shotgun" would certainly be tied to deployed boosters of the time frame in question. These would include, most likely, the SS-9, SS-10, SS-Follow-On Small, and SS-Follow-On Large; their ranges would be within the ICBM nominals of 6000 to 7000 NM (Non Rotating Earth). There has been no evidence collected [REDACTED] which indicates development of an Extended Range missile fired to 14,000 to 16,000 NM to approach the U.S. from the south. The wisdom of such a system is doubtful because the longer flight time would make them highly vulnerable to detection and there would be a significant degradation in range accuracy. Too, costly inefficiencies would result through having to reduce markedly the size of the payload carried. DIA 25X1

3. (S) Although DIA does not anticipate a MIRV system before 1970, it is conceivable that the "shotgun" package could be deployed sooner. Again there is no evidence of this, but it is clearly within the Soviet's capabilities. As with the MIRV, there is no intelligence upon which to base an assessment of the payload. However, Tables I and II have been prepared to show a feasible mix. We must stress that these tables in no way should be construed as being a postulation of what the Soviets are actually doing, or intend to do. They merely represent a reasonable approach. Background to the tables is covered below. 25X

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4. (S) Table I. Number and Weight of Warheads. [REDACTED]

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[REDACTED] the Soviets may try to obtain greater destructive efficiency for the systems in use, through using multiple warheads the weights of which are optimized. Empirical data and theory show that multiple warheads having the same total yield will always produce a higher level of lethality than a single equivalent warhead. If this be the case the problem is to determine the optimum size of the warheads [REDACTED]

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a. (S) If the advantages of multiples are obvious to the Soviets and they choose to optimize the weights, the number of vehicles carried

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by a single missile will be determined by the total load carrying capacity of the selected system. Table I shows the number which could be carried for the systems indicated. The vehicles themselves could have ballistic coefficients ranging from [REDACTED] per square foot with a unit warhead efficiency ranging from [REDACTED] respectively. These ranges were chosen since there will not be an appreciable increase in the REV weight for a corresponding increase in ballistic coefficient. Thus, the optimum weight used could fit within the range of ballistic coefficients without resorting to sub-optimization and decreased efficiencies. In preparing the table, the assumption was made that the weight required to package the multiples would be [REDACTED] of the total payload weight. This would include the weight of the REV ejection mechanism.

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b. (S) Range and CEP. The multiples would be carried aboard delivery systems with a range between 6,000 and 7,000 NM (NRE). The CEP of the entire package would probably be somewhat higher than that of a single warhead - probably be in the neighborhood of [REDACTED]. However, the damage inflicted by the multiple package would be equivalent to that inflicted by a single warhead having a lesser CEP and equal total yield.

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c. (S) Reliability. Through improved technology, the overall reliability of the missile systems using multiples may increase from 3 to 5 percent during the time frame. However, DIA doubts that they will increase much above that because of the deteriorating effect of time on unused and unchecked individual components. Thus, the overall reliability is expected to be approximately:

| | |
|----------|-----|
| SS-6 | 60% |
| SS-7 | 60% |
| SS-8 | 60% |
| SS-9 | 65% |
| SS-10 | 65% |
| SS-Small | 60% |
| SS-Large | 60% |

5. (S) Table II. Payload Mix. The table represents only a feasible payload mix and is certainly not presented as an estimate of Soviet intentions. The loads depicted are not optimized from the standpoint of delivery systems carrying the minimum number of warheads needed to insure an acceptable level of destruction, nor have they been optimized for the minimum number of decoys needed to insure sufficient penetration to achieve acceptable damage. The mixes-- [REDACTED]

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[REDACTED] represent greater offensive penetration than does a higher proportion allocated to REV's or penails.

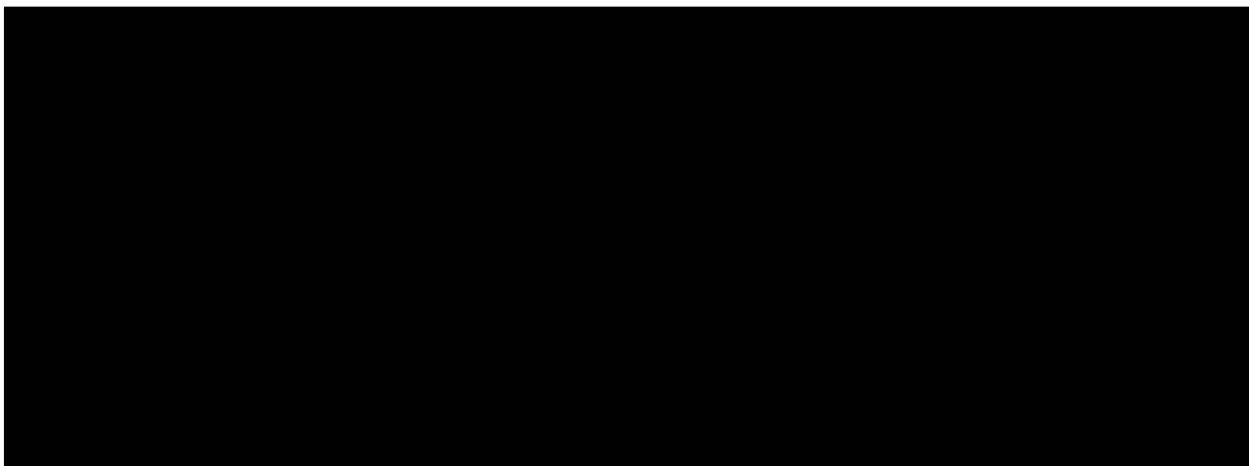
a. (S) The upper limits of gross payload (Col 3, Table I), have been selected as the gross weight available for multiples. Moreover,

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we assumed the packaging to require [REDACTED] of the gross. This was selected in order to approximate a worst case condition.



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g. (U) Table I comments regarding range and reliability are applicable to Table II.

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